

REMARKS

Applicants respectively request reconsideration. Claims 1-9, 11, 14-18 and 130-146 were previously pending in this application. Claims 14, 130, 131 and 138 have been amended. New claims 147-148 have been added. As a result, claims 1-9, 11, 14-18 and 130-148 are pending for examination with claims 14, 130, 131, 138, 147 and 148 being independent claims. No new matter has been added.

Amendments to Objected-To Claims

Claims 1-4, 7-9, 14, 17, 133 and 140 were objected to in the Office Action as being dependent upon rejected base claims, but would be allowable if rewritten in independent form. Claim 14 has been amended into independent form. Claims 1-4, 7-9, 17, 133 and 140 are now dependent upon amended independent claims, which the Applicants believe are allowable for the reasons discussed below.

Amendments to Rejected Claims

Claims 5, 6, 11, 15, 16, 18, 130-132, 134-139 and 141-146 were rejected in the Office Action. The amendments to independent claims 130, 131 and 138 are responsive discussions between the undersigned and Examiner Edward J. Cain during a series of telephone interviews, which are described in more detail below.

Amendments to independent claims 130-131 and 138 find support throughout the specification. Claim 130, which recites a luminescent polymer comprising a plurality of triple bonds and at least one aromatic group, is supported in the specification on, for example, page 2, lines 7-15 and page 24, lines 1-7. Claims 130 and 131, which recite a nucleic acid covalently attached to a luminescent polymer, are supported in the specification on, for example, Example 7 on page 35, line 29 to page 36, line 7, in connection with Fig. 13. New independent claim 147, which recites a particle comprising a nucleic acid and a luminescent polymer wherein the particle luminesces when comprising the nucleic acid, is supported in the specification on, for example, page 36, lines 8-14. New independent claim 148, which recites a particle consisting essentially of a luminescent polymer, is supported in the specification on, for example, page 25, lines 23-28 and page 15, lines 2-7.

Summary of Telephone Interviews with Examiner

Applicants' representative Michael J. Pomianek, Ph.D., Reg. No.: 46,190 and Jessamine Lee, Ph.D. (hereinafter collectively referred to as "the Undersigned") thank Examiner Edward J. Cain for the courtesy of telephone interviews conducted on January 17, 2006, January 26, 2006 and February 14, 2006 with the Undersigned. The following is a complete written statement of the substance of the interviews and the reasons presented during the interviews as warranting favorable action in accordance with the requirements 37 C.F.R. §1.133(b) and M.P.E.P. §713.04.

The Undersigned telephoned the Examiner on January 17, 2006 to conduct the first telephone interview. During the interview, the rejection of independent claims 130, 131 and 138 under 35 U.S.C. §102(e) over U.S. Patent No. 6,589,731 to Chen, et al. (herein after "the Chen reference") was discussed.

The Undersigned and the Examiner discussed possible ways of amending the language describing the particles recited in claim 130 to clarify the patentable distinction of the particles over the polymers disclosed in the Chen reference. Regarding claims 131 and 138, the Undersigned and Examiner discussed differences between how a nucleic acid may be attached to the luminescent polymer described in the instant application and in the Chen reference. The Examiner indicated that he would need to review the file and the Chen reference in greater detail before conducting a more detailed interview on this topic, and he agreed to a follow-up interview on January 26, 2006.

The Undersigned telephoned the Examiner on January 26, 2006 to conduct the second telephone interview. During the interview, the rejection of independent claims 130, 131 and 138 under 35 U.S.C. §102(e) over the Chen reference were once again discussed.

In relation to claim 130, the Undersigned and the Examiner further discussed differences between particles and polymers of the invention and the polymers and materials disclosed in the Chen reference. Regarding claims 131 and 138, the Undersigned proposed amending these claims to recite that the attachment of a nucleic acid to a luminescent polymer is a covalent attachment, which the Undersigned indicated did not appear to be shown, illustrated, or enabled in the Chen reference. The Examiner requested that the Undersigned send by facsimile or e-mail a list of proposed claim amendments for his review.

On February 3, 2006, the Undersigned sent the Examiner an email containing proposals for amendments to independent claims 130, 131 and 138 of the instant application. The Examiner sent an e-mail in reply asking for a follow-up e-mail pointing out where in the specification support could be found for covalent attachment of nucleic acids to the polymer. On February 6, 2006, the Undersigned responded via e-mail providing the requested information. A print-out of the above-described e-mail correspondence is attached in Appendix A.

The Undersigned telephoned the Examiner on February 14, 2006 to conduct the third telephone interview. During the interview, the rejection of claims 130, 131 and 138 under 35 U.S.C. §102(e) over the Chen reference where discussed.

Each of the claim amendments proposed in the February 3, 2006 email were discussed. Regarding the suggested amendment to claim 130 to recite a luminescent polymer comprising a plurality of triple bonds and at least one aromatic group, the Examiner agreed that the combination of a plurality of triple bonds and at least one aromatic group appeared to be patentably distinguishable over the Chen reference. The Undersigned also suggested amending this claim to recite a particle "consisting essentially of" the luminescent polymer. The Examiner agreed to further consider such an amendment or new claim presenting such recitation if presented in a written response to the outstanding Office Action. Regarding the suggested amendment to claim 131 to recite a particle comprising a nucleic acid covalently attached to the luminescent polymer, the Undersigned noted that a nucleic acid covalently attached to a luminescent polymer was supported in the specification on, for example, Example 7 on page 35, line 29 to page 36, line 7; in connection with Fig. 13. The Undersigned pointed out that, in the Chen reference, a covalent bond is not formed between the polymer and the tethering unit (which includes the nucleic acid). By contrast, the Undersigned explained that Chen employs a readily dissociable bond, such as metal-ligand complex association, because in order for the sensor to function as designed, the tethering unit must readily dissociate from the polymer upon interaction with an analyte. The Examiner agreed that the proposed covalent bond limitation may distinguish the Chen teaching, and requested that the Undersigned present further arguments in a written reply to the outstanding Office Action describing how this amendment patentably distinguishes Chen. The proposed amendment to claim 131 reciting a particle comprising a nucleic acid and a luminescent polymer, wherein the

luminescent polymer comprises a triple bond, and wherein the particle luminesces when comprising the nucleic acid was also discussed. The Examiner agreed that this amendment would patentably distinguish the Chen reference.

Remarks responsive to each of the bases of rejection in the Office Action are presented below.

Rejections Under 35 U.S.C. §102(e)

The Patent Office has rejected claims 5, 6, 11, 15, 16, 18, 130-132, 134-139 and 141-146 under 35 U.S.C. §102(e) as being anticipated by the Chen reference.

Independent claim 130 has been amended to recite a luminescent polymer comprising a plurality of triple bonds and at least one aromatic group. By contrast, the Chen reference does not appear to disclose or suggest such a polymer material. Accordingly, withdrawal of the rejection of independent claim 130 on the present basis is respectfully requested.

Claim 146 depends from and includes all of the limitations of independent claim 130, and, therefore, is patentable in view of the Chen reference for at least the reasons stated above for independent claim 130. Accordingly, withdrawal of the rejection of claim 146 on the present basis is also respectfully requested.

Independent claim 131 has been amended to recite a nucleic acid covalently attached to a luminescent polymer. Nowhere in the Chen reference is a nucleic acid covalently attached to a luminescent polymer taught or suggested. By contrast, Chen employs a readily dissociable bond, such as a metal-ligand complex association, because in order for the Chen sensor to function as designed, the intermediate combination must readily dissociate from the polymer upon interaction with an analyte. For instance, Chen explains that “[C]omplexing (binding or association) of the polymer with the intermediate combination (C-T-R) results in little or no fluorescence. C refers to a complexing agent also referred to as a property-altering element” (column 3, lines 46-49). Moreover, the suitable complexing agents specifically disclosed in Chen are methyl viologen, squaraine, and other electron-accepting moieties (column 6, lines 29-31). Such electron-accepting moieties – e.g. methyl viologen – would not tend to form a covalent bond with the polymer, but instead would form a “relatively weak ground-state ‘donor-acceptor’ complex” with the polymer (e.g. see, column 7, lines 35-38). The relatively weak association between methyl viologen and the

polymer is further discussed in column 9, lines 14-51. As explained by Chen, by using such complexing agents that can associate reversibly and relatively weakly with the polymer, the "intermediate combination ... is adapted for separation from the polymer." (Column 6, lines 32-35). This reversible separation is necessary for the Chen technique to function for its intended purpose. The same separation would not readily occur if the intermediate unit was covalently attached to the polymer. Accordingly, withdrawal of the rejection of independent claim 131 on the present basis is respectfully requested.

Claims 5, 6, 11, 15, 16, 18, 132, 134 and 141-145 depend from and include all of the limitations of independent claim 131, and, therefore, are patentable over the Chen reference for at least the reasons stated above for independent claim 131. Accordingly, withdrawal of the rejection of claims 5, 6, 11, 15, 16, 18, 132, 134 and 141-145 on the present basis is also respectfully requested.

Similarly, independent claim 138 has been amended to recite allowing a nucleic acid to become covalently attached to a luminescent polymer. As described above, nowhere in the Chen reference does it appear that allowing a nucleic acid to become covalently attached to a luminescent polymer is taught or suggested. Accordingly, withdrawal of the rejection of independent claim 138 on the present basis is respectfully requested.

Claim 139 depends from and includes all of the limitations of independent claim 138, and, therefore, is patentable over Chen for at least the reasons stated above for independent claim 138. Accordingly, withdrawal of the rejection of claim 139 on the present basis is also respectfully requested.

New Claims

New independent claim 147 recites a particle comprising a nucleic acid and a luminescent polymer wherein the particle luminesces when comprising the nucleic acid. Nowhere in the prior art of record does it appear that a particle comprising a nucleic acid and a luminescent polymer wherein the particle luminesces when comprising the nucleic acid is taught or suggested. For instance, Chen appears to teach that the particle does not fluoresce until the C-T-RA complex

dissociates from the polymer (see, e.g., Fig. 1a and column 3, lines 28-43). Accordingly, claim 147 is believed to be patentable over the prior art of record.

New independent claim 148 recites a particle consisting essentially of a luminescent polymer. Nowhere in the prior art of record does it appear that a particle comprising essentially of a luminescent polymer is taught or suggested. For instance, Chen appears to only teach polymers "in the form of a film on a variety of substrate surfaces, e.g., on a fiber optic probe, on tethered sols or beads or on micro-latex particles, or on a soluble substrate, i.e., in a suitable liquid medium, and the like" (column 4, lines 37-41). Accordingly, claim 148 is believed to be patentable over the prior art of record.

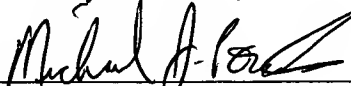
CONCLUSION

A Notice of Allowance is respectfully requested. The Examiner is requested to call the Undersigned at the telephone number listed below if this communication does not place the case in condition for allowance.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825.

Dated: February 27, 2006

Respectfully submitted,

By 

Michael J. Pomianek

Registration No.: 46,190

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Appendix A

From: Lee, Jessamine
Sent: Monday, February 6, 2006 2:54 PM
To: Cain, Edward [mailto:Edward.Cain@USPTO.GOV]
Subject: RE: Application Serial No.: 09/997,999; Luminescent Polymer Particles - Proposed claim amendments

Dear Examiner Cain:

Support for a covalently attached nucleic acid can be found in several places throughout the application as filed. For example, please see the following sections (referring to the paragraph numbering of the published application):

- Claim 84 in the original application teaches an entity that can be covalently attached to the polymer, the entity able to specifically bind to a biological, biochemical, or chemical molecule.
- Such an entity is referred to in the specification as a binding site, e.g., as taught in paragraph [0144]: a binding site may comprise a biological, biochemical or chemical molecule able to bind to another biological, biochemical or chemical molecule.
- Paragraph [0145] teaches that a binding site may comprise a nucleic acid.
- Therefore, a nucleic acid molecule may be covalently attached to a polymer.

- An explicit example of a nucleic acid covalently attached to a polymer can be found in Example 7 and associated Figure 13.
- Paragraph [0184] teaches particle 360, which may be bound to carboxyl-terminated nucleic acid 368, yielding functionalized particle 375 comprising a nucleic acid.
- Specifically, Figure 13 shows that particle 360 may comprise an amine-terminating group, which can react with carboxyl-terminated nucleic acid 368 to form functionalized particle 375.
- Reacting the amine group with the carboxyl group forms a covalent bond.
- Therefore, this example shows that a nucleic acid molecule may be covalently attached to a polymer.

Please let us know if you have any further questions.

Regards,
Mike Pomianek
Jas Lee

From: Cain, Edward [mailto:Edward.Cain@USPTO.GOV]
Sent: Friday, February 03, 2006 2:05 PM
To: Lee, Jessamine
Subject: RE: Application Serial No.: 09/997,999; Luminescent Polymer Particles - Proposed claim amendments

Dear Ms Lee,

Can you point to the areas of the specification as originally filed where you find support for the limitations to a covalently attached nucleic acid?

Thanks,
Ed Cain

-----Original Message-----

From: Lee, Jessamine [mailto:Jessamine.Lee@WolfGreenfield.com]
Sent: Friday, February 03, 2006 12:17 PM
To: Cain, Edward
Cc: Pomianek, Michael; Oyer, Timothy
Subject: FW: Application Serial No.: 09/997,999; Luminescent Polymer Particles - Proposed claim amendments

Dear Examiner Cain:

As per the conversation you had with Mike Pomianek yesterday, here are several proposed amendments to the independent claims for your consideration.

A131. An article, comprising:
a particle comprising a nucleic acid covalently attached to and a luminescent polymer, wherein the luminescent polymer comprises a triple bond.

B438. A method, comprising:
allowing a nucleic acid to become covalently attached to a luminescent polymer, wherein the luminescent polymer comprises a triple bond.

C430. A polymeric article, comprising:
a particle comprising a luminescent polymer, wherein the luminescent polymer comprises a plurality of triple bonds and at least one aromatic group.

D434. An article, comprising:
a particle comprising a nucleic acid and a luminescent polymer, wherein the luminescent polymer comprises a triple bond, and wherein the particle luminesces when comprising the nucleic acid.

E430. A polymeric article, comprising:
a particle comprising throughout the particle a luminescent polymer, wherein the luminescent polymer comprises a plurality of triple bonds.

Please call Mike Pomianek at 617-646-8288 to propose a time when we can discuss these amendments. We look forward to speaking with you.

Best regards,

Michael Pomianek, Reg no. 46190
Jas Lee